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pair of ring members are arranged at an interval from each other at a rear of the screw portion around a center axis of the plunger. The plurality of vane members are arranged radially from the center axis of the plunger between the ring members. The outer diameters of the ring members and the vane members are equal to an inner diameter of the syringe barrel or slightly smaller than the inner diameter and the outer diameters of the ring members and the outer diameters of the vane members are equal to each other.

IN THE CLAIMS:

Please amend claim 1 as set forth below in clean form. Additionally, in accordance with 37 CFR 1.121(c)(1)(ii), the amended claim(s) are set forth in a marked-up version in the page(s) attached to this Amendment.

1. (AMENDED) A plunger for a syringe used for supporting and moving a gasket inserted in a syringe barrel, comprising:

a screw portion formed at a tip thereof for mounting the gasket;

A2
a pair of ring members arranged at an interval from each other at a rear of said screw portion around a center axis of the plunger; and

a plurality of vane members arranged radially from the center axis of the plunger between said ring members,

wherein outer diameters of said ring members and said vane members are equal to an inner diameter of the syringe barrel or slightly smaller than the inner diameter and the outer diameters of said ring members and the outer diameters of said vane members are equal to each other.

REMARKS

Claims 1-5 are pending in the application. By this Amendment, claim 1 is amended.

The drawing figures are objected to under 37 CFR 1.83 (a). A Request for Approval of Drawing Corrections proposing red-line corrections to drawing figures is filed herewith to obviate the objection. Withdrawal of the objection is respectfully requested. Additionally, a Letter to the Official Draftsperson is filed herewith submitting formal drawing Fig. 1 that incorporates the red-line correction thereto.

Furthermore, with regard to the drawing figures and in the present invention, a plunger body is composed of four ribs 16. Fig. 4 shows a cross-sectional view of the plunger body. As understood from Fig. 4, the plunger body is composed of the four ribs 16 arranged in a cross shape.

The Abstract of the Disclosure is objected to. A Substitute Abstract of the Disclosure is filed herewith to obviate the objection. Withdrawal of the objection is respectfully requested.

Claims 1-5 are rejected under 35 U.S.C. 102(b) as anticipated by Kimber et al. (WO 96/14100). The rejection is respectfully traversed.

Claim 1 is directed to a plunger for a syringe used for supporting and moving a gasket inserted in a syringe barrel includes a screw portion, a pair of ring members and a plurality of vane members. Claim 1 recites that the screw portion is formed at a tip thereof for mounting the gasket. Claim 1 also recites that the pair of ring members are arranged at an interval from each other at a rear of the screw portion around a center axis of the plunger. Further, claim 1 recites that the plurality of vane members are arranged radially from the center axis of the plunger between the ring members. Additionally, claim 1 recites that the outer diameters of the ring members and the vane members are equal to an inner diameter of the syringe barrel or slightly smaller than the inner diameter and the outer diameters of the ring members and the outer diameters of the vane members are equal to each other.

As described in the background of the present invention, when using a prefilled syringe, it is not easy to make the center axis of a syringe barrel and a center axis of a plunger coincide with each other. When both of them become skewed in skewed

positions and then the plunger is pushed to push out the contents, its movable stopper does not slide stably and fluid leakage occurs between a gasket and the syringe barrel. Especially, in the case of an injection solution having a high viscosity whose filling amount is large such as a contrast medium, a large force to push out the plunger (injection force) is required. Accordingly, a solution for such problems is desired at clinical sites.

Consequently, an object of the present invention is to mount a gasket on a screw portion at the tip of a plunger in a state that the center axis of a syringe barrel and a center axis of a plunger are easily made to coincide with each other.

In contrast, in WO 100, the background of the invention is such that, in a prefilled syringe, a closure is securely attached so as to seal the contents so that it is difficult to remove the closure at a clinical site.

Therefore, an object of the cited reference is to provide an overcap by which the closure of a prefilled syringe can be easily removed.

Thus, the background and the object of the invention are obviously different between the present invention and the cited reference.

In One of the characteristics of the present invention is the point that the "outer diameters of said ring members and said vane members are equal to an inner diameter of the syringe barrel or slightly smaller than the inner diameter."

In contrast, in the embodiment described in Figs. 6 and 7 of the cited reference, the discs 32 and 33 provided at the tip of a plunger rod 28 are for preventing the plunger from being removed from the syringe. The outer diameters of these discs 32 and 33 are obviously smaller from the inner diameters of the barrel 2. Also, as can be seen in Figs. 6 and 7 of the cited reference, a portion similar to the vane member is shown between the discs 32 and 33 but its outer diameter (of the vane member shown in Figs. 6 and 7 of the cited the reference) is smaller than the outer diameters of the discs 32 and 33.

Thus, the characteristics of the claimed invention are not described in the cited reference. Further, descriptions that mention the characteristics of the present invention cannot be recognized in the cited reference.

According to the claimed invention, outer circumferential surfaces of the ring members and the outer circumferential surfaces of the vane members abut on an inner surface of the syringe barrel to guide the plunger so that the center axis of the syringe barrel naturally becomes in a coinciding state with the center axis of the plunger. As a result, a gasket can be mounted at the tip of the plunger in a correct state, so that the gasket can move smoothly in the syringe barrel. Further, fluid leakage does not occur between the inner surface of the syringe barrel and the outer circumferential surface of the gasket.

In contrast, in the embodiment described in Figs. 6 and 7 of the cited reference, the outer diameters of the discs 32 and 33 are smaller than the inner diameter of the barrel 2, so that the operation in effect of the present invention as described above cannot be obtained. Further, descriptions that mention the operation and effect of the claimed invention cannot be recognized in the cited reference.

It is respectfully submitted that the rejection is improper because the applied art fails to teach each element of claim 1. Specifically, the applied art fails to teach outer diameters of the ring members and the vane members are equal to an inner diameter of the syringe barrel or slightly smaller than the inner diameter and the outer diameters of the ring members and the outer diameters of the vane members are equal to each other.

As a result, it is respectfully submitted that claim 1 is allowable over the applied art.

Withdrawal of the rejection is respectfully requested.

Claim 3 is rejected under 35 U.S.C. 103(a) as unpatentable over Kimber. The rejection is respectfully traversed.

Claim 3 depends from claim 1 and includes all of the features of claim 1. It is respectfully submitted that claim 3 is allowable at least for the reason claim 1 is allowable as well as for the features it recites.

Withdrawal of the rejection is respectfully requested.


In view of the foregoing, reconsideration of the application and allowance of the

pending claims are respectfully requested. Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' representative at the telephone number listed below.

Should additional fees be necessary in connection with the filing of this paper or if a Petition for Extension of Time is required for timely acceptance of the same, the Commissioner is hereby authorized to charge Deposit Account No. 18-0013 for any such fees and Applicant(s) hereby petition for such extension of time.

Respectfully submitted,

Date: May 27, 2003

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Enclosure(s): Appendix I (Marked-Up Version of Amended Claims)
Appendix II (Marked-Up Version of Amended Specification)
Request for Approval of Drawing Corrections
(One sheet of red-line corrected drawing (FIG. 1))
Letter to Official Draftsperson
(One sheet of formal drawing (FIG. 1))

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APPENDIX I

(MARKED-UP VERSION OF AMENDED CLAIMS)

1. (AMENDED) A plunger for a syringe used for supporting and moving a gasket inserted in a syringe barrel, comprising:

a screw portion formed at a tip thereof for mounting the gasket;

a pair of ring members arranged at an interval from each other at a rear of said screw portion around a center axis of the plunger; and

a plurality of vane members arranged radially from the center axis of the plunger between said ring members,

wherein outer diameters of said ring members and said vane members are equal to an inner diameter of the syringe barrel or slightly smaller than the inner diameter and the outer diameters of said ring members and the outer diameters of said vane members are equal to each other.

APPENDIX II

(MARKED-UP VERSION OF AMENDED SPECIFICATION)

ABSTRACT

~~— A gasket 7 used for a prefilled syringe 1 in which liquid 3 is filled, having a~~
~~constriction 8 on its circumferential side face in contact with an inner surface of a~~
~~syringe barrel 2 and having a bottom face 7c which is not in contact with the liquid 3~~
~~whose circumference is formed in a tapered shape.~~

ABSTRACT OF THE DISCLOSURE

A plunger for a syringe used for supporting and moving a gasket inserted in a
syringe barrel includes a screw portion, a pair of ring members and a plurality of vane
members. The screw portion is formed at a tip thereof for mounting the gasket. The
pair of ring members are arranged at an interval from each other at a rear of the screw
portion around a center axis of the plunger. The plurality of vane members are
arranged radially from the center axis of the plunger between the ring members. The
outer diameters of the ring members and the vane members are equal to an inner
diameter of the syringe barrel or slightly smaller than the inner diameter and the outer
diameters of the ring members and the outer diameters of the vane members are equal
to each other.